Mapping the Sea Floor Geology Offshore of The New York-New Jersey Metropolitan Area Using Sidescan-Sonar: Preliminary Report

by

Schwab, W.C.[1], Corso, W.[2], Allison, M.A.[3], Butman. B.[1], Denny, J.F.[1], Lotto, L.L[3], Danforth, W.W.[1], Foster, D.S.[1], O'Brien, T.F.[1], Nichols, D.A.[1], Irwin, B.J.[1], and Parolski, K.F[1].

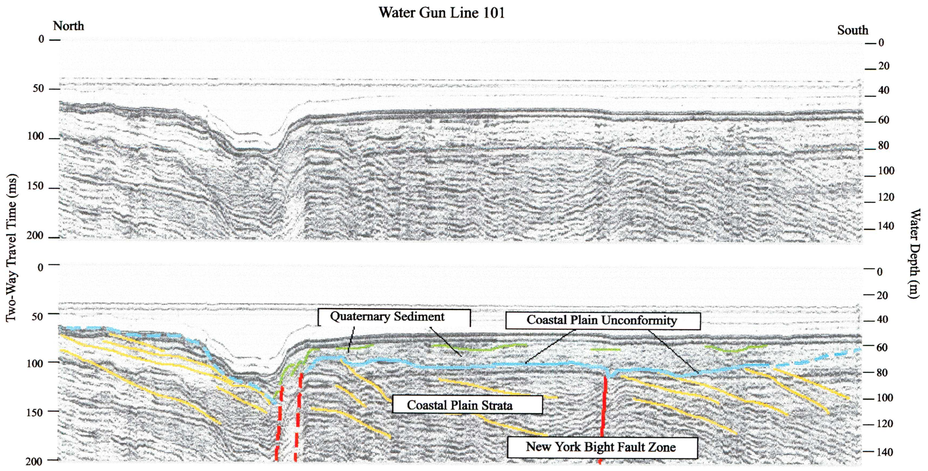

Figure 13. Representative 15 cubic-inch watergun subbottom profile (see Figure 3 for location) showing major features of the Hudson Shelf Valley described in the text. Faults are shown as red lines (dashed where uncertain).

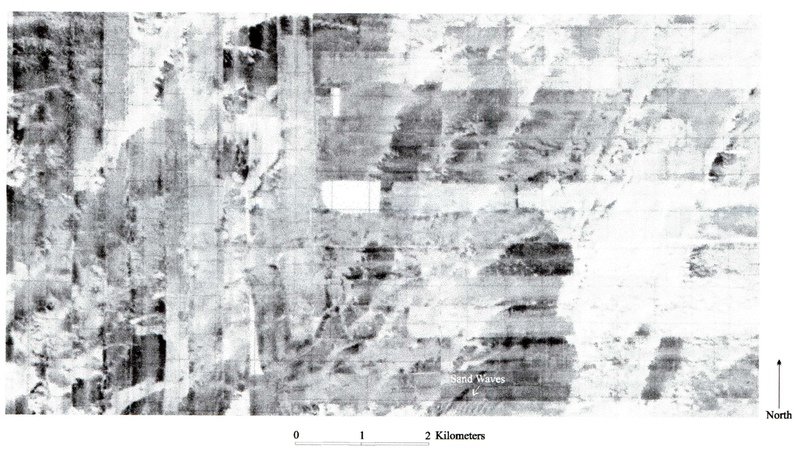

Figure 14. Sidescan-sonar image of the area west of the Hudson Shelf Valley (see Figure 3 for location). This area, similar to the area shown in Figure 8, is an area of outcropping Coastal Plain strata, an erosional lag of gravelly sediment, and, in places, a thin veneer of medium- to fine-grained sand.

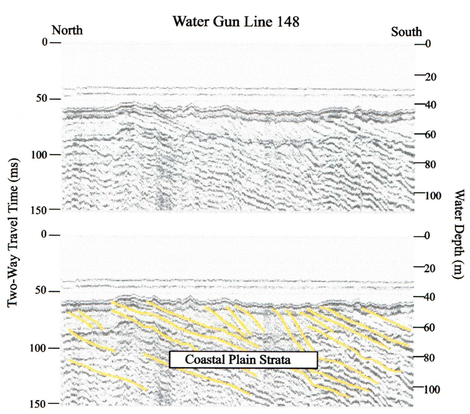

Figure 15. Representative 15 cubic-inch watergun subbottom profile west of the Hudson Shelf Valley (see Figure 3 for location) showing the Coastal Plain strata outcropping or coming close to the sea floor.

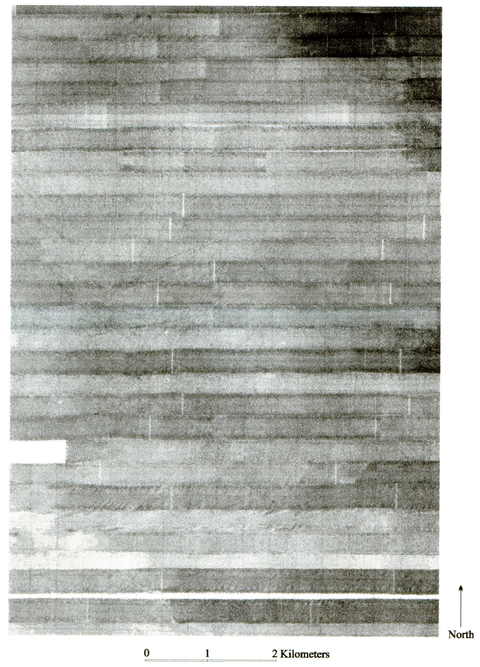

Figure 16. Sidescan-sonar image of the area east of the Hudson Shelf Valley showing the effect of extensive shellfish trawling on the sea floor in sandy areas of moderate-low backscatter (see Figure 3 for location).

Table 1: Sediment textural properties

Sample No.	Lat (°)	Long (°)	Grav (%)	Sand (%)	Silt (%)	Clay (%)	Mean (Phi)	Median (Phi)	Stan. Dev.	Skew.	Kurt.
1995											
1(95)	40°29.7357	73°30.5273	23.56	72.48	2.11	1.85	0.43	0.41	2.09	0.79	5.33
2	40°29.3146	73°30.8125	71.58	26.83	1.00	0.60	1.33	1.04	1.33	2.38	28.58
3	40°29.5531	73°32.1454	0.00	99.37	0.36	0.27	2.37	2.41	0.79	1.15	16.26
4	40°28.5176	73°31.8943	0.00	99.00	0.59	0.42	2.83	2.92	0.64	2.48	43.64
5	40°27.0644	73°31.9319	0.36	99.21	0.29	0.15	2.14	2.13	0.75	0.66	16.31
6	40°25.6317	73°31.9675	0.00	99.73	0.18	0.09	1.49	1.5	0.66	1.07	22.42
7	40°24.8063	73°31.4495	0.11	99.57	0.20	0.12	1.60	1.69	0.59	2.04	43.36
8	40°24.1743	73°30.6442	0.28	99.60	0.08	0.04	1.14	1.13	0.64	0.68	14.13
9	40°25.2521	73°33.6148	0.00	99.36	0.40	0.24	2.28	2.34	0.79	1.14	15.08
10	40°24.4331	73°34.1488	18.41	81.33	0.16	0.10	0.38	0.16	1.35	0.18	2.88
11	40°25.2809	73°36.2986	0.00	99.75	0.16	0.09	1.65	1.74	0.52	2.25	51.72
12	40°24.6715	73°37.1145	11.30	88.42	0.17	0.11	0.47	0.33	1.09	0.01	7.28
13	40°24.2903	73°38.7263	0.00	99.79	0.14	0.07	0.64	0.76	0.59	2.20	42.47
14	40°25.5721	73°39.5238	0.00	98.40	1.03	0.57	2.86	2.95	0.73	2.28	35.18
15	40°26.9658	73°38.4114	1.12	98.31	0.36	0.21	1.10	1.18	0.98	0.77	11.55
16	40°26.9290	73°37.3326	14.62	85.29	0.06	0.03	0.24	0.24	1.17	0.18	3.01
17	40°27.1056	73°34.9029	0.35	99.25	0.26	0.14	1.68	1.76	0.68	1.22	26.71
18	40°27.5173	73°34.8942	42.43	56.91	0.42	0.23	0.54	0.87	1.98	0.19	0.81
19	40°26.8830	73°33.5584	23.28	73.77	1.93	1.02	1.81	1.26	2.3	0.04	0.51
20	40°27.0855	73°33.2859	0.00	98.58	0.82	0.61	2.72	2.82	0.77	2.08	31.49
21	40°27.4973	73°33.2271	0.00	99.20	0.51	0.29	2.47	2.49	0.73	1.42	23.89
22	40°27.4939	73°33.3007	0.00	99.37	0.40	0.23	2.06	2.17	0.76	1.40	19.22
23B	40°28.1183	73°33.5320	54.46	41.64	2.34	1.56	1.51	1.06	2.89	0.50	1.34
24	40°28.3409	73°34.8769	0.00	99.38	0.36	0.26	2.45	2.45	0.65	1.78	34.95
25	40°29.1743	73°35.6685	0.18	99.33	0.34	0.15	0.90	0.99	0.70	1.97	37.34
26	40°29.1874	73°36.7471	33.45	66.17	0.25	0.13	0.07	0.49	1.68	0.01	0.96
27	40°29.4029	73°37.5518	41.76	58.03	0.14	0.07	0.00	0.70	2.12	0.05	1.11
28	40°28.7916	73°38.1036	21.56	77.93	0.33	0.18	0.22	0.11	1.18	0.78	8.72
29	40°28.3798	73°38.1120	0.00	99.48	0.35	0.17	1.54	1.58	0.73	1.45	25.91
30	40°29.2650	73°43.4854	0.00	94.22	3.92	1.86	2.89	2.98	1.28	1.30	10.08
31	40°28.4850	73°45.4013	0.00	90.33	6.88	2.80	3.17	3.31	1.40	1.22	7.62
32	40°29.3114	73°46.2080	0.00	82.52	13.03	4.44	3.10	3.54	1.77	0.88	2.86
33	40°27.8911	73°49.9806	99.25	0.35	0.31	0.10	5.43	5.3	0.89	6.01	155.08
34	40°27.1882	73°49.8812	0.00	67.15	22.55	10.31	3.69	4.57	2.03	0.60	0.27
35	40°27.0474	73°48.6336	0.66	80.50	13.05	5.78	3.23	3.62	1.94	0.70	2.51
36	40°25.4250	73°50.2676	44.99	54.87	0.10	0.03	0.46	0.64	2.18	0.02	1.39
38	40°23.1700	73°49.7477	0.00	13.61	55.21	31.18	7.09	6.75	2.23	0.43	0.47
39	40°22.9155	73°48.1792	61.88	26.92	7.86	3.34	2.06	6.10	3.40	0.67	0.93
40	40°24.7912	73°48.9422	1.84	72.68	16.86	8.61	3.21	3.73	2.36	0.46	0.58
41	40°24.5542	73°46.5116	0.00	77.73	15.53	6.74	3.56	4.14	1.75	0.93	2.44
42	40°24.7742	73°44.9012	0.00	99.50	0.36	0.14	1.99	2.04	0.63	1.58	28.66
43	40°25.7681	73°43.6148	0.00	98.76	0.88	0.36	1.81	1.95	0.78	2.18	33.12
44	40°25.3345	73°41.6586	0.00	99.11	0.62	0.28	2.12	2.2	0.78	1.52	20.98
45	40°25.3663	73°40.5725	0.00	97.19	1.67	1.15	3.26	3.25	0.89	2.02	25.29
46	40°27.2022	73°43.2500	0.00	90.52	6.03	3.45	3.00	3.25	1.56	1.11	6.12
47	40°27.2295	73°46.5002	0.00	87.43	8.67	3.90	3.18	3.51	1.53	1.23	5.79
48	40°23.4930	73°50.0147	0.00	12.76	59.63	27.61	6.64	6.56	2.09	0.16	0.31
49B	40°23.4792	73°47.9777	0.00	49.79	35.39	14.82	4.02	5.11	2.22	0.34	0.76
50	40°23.4792	73°46.0064	0.00	97.75	1.52	0.73	2.46	2.53	1.01	1.37	15.00
51	40°23.4825	73°43.9311	0.00	99.30	0.48	0.22	2.13	2.15	0.69	1.71	28.28
52	40°23.4880	73°41.9766	0.00	99.18	0.57	0.25	2.39	2.39	0.76	1.17	18.33

Sample Number	Lat (°)	Long (°)	Grav (%)	Sand (%)	Silt (%)	Clay (%)	Mean (phi)	Median (phi)	Stan. Dev.	Skew.	Kurt.
1996											
1(96)	40°33.6514	73°48.7849	0.23	94.75	4.38	0.64	3.32	3.36	0.76	1.47	29.85
3	40°32.6269	73°48.8188	0.25	96.89	2.48	0.38	3.32	3.38	0.62	1.14	44.71
6	40°31.9908	73°48.8244	0.39	97.48	1.77	0.36	3.31	3.39	0.69	0.06	37.59
9	40°32.2147	73°47.7358	0.16	96.07	2.40	1.38	3.33	3.31	0.94	1.93	24.16
10	40°31.4149	73°47.7780	0.64	96.75	1.93	0.68	3.16	3.21	0.82	1.08	29.41
11	40°33.6368	73°47.7046	0.05	96.49	3.07	0.40	3.1	3.2	0.77	0.94	18.90
14	40°33.4225	73°46.6338	0.77	96.62	2.17	0.43	2.68	2.66	0.93	0.53	14.36
15	40°32.6029	73°46.6576	0.83	96.41	2.30	0.45	2.90	2.93	0.9	0.21	18.10
17	40°31.7423	73°45.9063	0.04	97.18	2.34	0.44	2.73	2.66	0.82	1.21	21.06
19	40°33.2037	73°45.8465	0.03	98.58	1.09	0.31	2.39	2.31	0.86	1.07	12.99
21	40°34.0221	73°45.8201	0.18	98.06	1.52	0.24	2.61	2.58	0.80	0.78	13.68
23	40°33.5710	73°45.0602	0.17	96.29	3.26	0.27	2.83	2.85	0.88	0.48	10.27
25	40°32.4256	73°45.0708	0.13	99.02	0.73	0.12	2.39	2.41	0.67	0.70	17.22
27	40°32.3561	73°43.6958	0.14	98.14	1.36	0.36	2.68	2.65	0.83	0.93	15.66
28	40°32.9783	73°43.9721	0.03	98.96	0.87	0.14	2.04	1.92	0.76	1.04	13.52
30	40°34.2152	73°44.0228	0.06	99.45	0.39	0.10	1.93	1.84	0.62	1.28	23.33
32	40°33.5845	73°43.1408	3.48	95.63	0.06	0.29	1.41	1.48	1.12	0.09	11.97
34	40°32.1526	73°42.9033	0.13	99.65	0.17	0.05	1.84	1.73	0.61	0.80	15.45
36	40°33.7752	73°42.0522	23.69	75.30	0.76	0.24	0.17	0.35	1.59	0.25	2.94
38	40°32.9615	73°42.0757	1.36	97.34	0.88	0.42	1.35	1.35	1.02	1.26	19.15
40	40°31.7000	73°40.7332	0.00	99.86	0.10	0.04	1.89	1.78	0.59	0.92	12.24
41	40°32.3227	73°40.7356	0.02	97.91	1.61	0.29	2.86	2.82	0.74	0.95	20.36
43	40°33.5604	73°40.7173	0.49	93.94	4.71	0.86	2.58	2.48	1.2	0.88	8.57
45	40°34.1699	73°39.8787	33.32	66.54	0.09	0.05	0.02	0.09	1.46	0.06	0.13
48	40°32.7290	73°39.9096	0.85	88.06	7.39	3.70	2.58	2.13	1.96	0.92	3.71
51	40°32.2934	73°38.8491	26.96	72.54	0.35	0.15	0.57	0.94	1.82	0.01	0.38
53	40°33.5302	73°38.8359	0.52	98.85	0.51	0.12	1.80	1.73	0.70	0.89	23.27
55	40°33.9317	73°37.4656	0.00	86.86	9.46	3.68	3.74	3.47	1.34	1.53	9.50
58	40°31.8807	73°37.4852	24.56	74.87	0.36	0.21	0.52	0.36	1.64	0.13	3.58
60	40°32.9057	73°36.9579	37.11	62.59	0.19	0.11	0.28	0.09	1.74	0.00	0.16
61	40°33.9186	73°36.3670	0.60	99.02	0.31	0.07	0.98	0.90	0.70	1.15	20.63
063B	40°32.4738	73°35.8637	1.21	98.02	0.59	0.18	2.39	2.43	0.95	0.83	19.35
067	40°33.3078	73°35.3271	0.22	98.56	0.98	0.23	2.26	2.28	0.76	1.13	21.08
069	40°33.8969	73°34.4834	0.00	99.37	0.49	0.13	2.44	2.45	0.54	1.8	41.77
072	40°32.8843	73°34.5052	7.42	91.66	0.51	0.40	0.81	0.76	1.30	0.62	8.36
074B	40°32.0401	73°34.5239	35.97	40.33	16.05	7.66	1.44	0.42	3.76	0.34	0.63
076	40°31.6334	73°33.4647	0.00	98.35	0.87	0.77	2.97	2.85	0.76	2.63	38.83
078	40°32.8391	73°33.4199	0.00	99.88	0.10	0.02	1.49	1.48	0.56	0.63	13.01
081	40°33.4525	73°32.8766	0.05	98.38	1.38	0.02	2.52	2.49	0.71	1.12	18.60
084	40°31.6055	73°32.0969	0.11	99.67	0.13	0.09	2.13	2.16	0.58	0.95	24.16
086	40°33.2242	73°32.0651	1.09	98.31	0.28	0.32	2.33	2.38	0.88	0.31	17.22
088	40°34.0907	73°30.9613	0.27	98.84	0.74	0.15	1.80	1.68	0.66	1.79	32.88
090	40°32.6566	73°30.9737	0.00	99.55	0.30	0.16	2.34	2.36	0.63	1.31	25.72
092	40°31.5969	73°30.4257	0.82	98.97	0.14	0.06	1.63	1.59	0.62	0.49	23.62
093	40°21.0605	73°51.4584	0.19	99.68	0.10	0.04	1.51	1.52	0.64	0.23	10.72
094B	40°18.9613	73°51.7561	56.25	42.17	0.89	0.69	1.05	1.25	1.79	1.01	8.50
096	40°20.0646	73°47.4691	0.33	50.44	31.66	17.57	5.30	3.98	2.42	0.15	1.01
098	40°21.0736	73°45.7977	0.97	98.04	0.70	0.29	2.81	2.85	0.94	0.81	21.49
102	40°18.7598	73°41.5181	0.02	99.22	0.53	0.23	2.98	2.98	0.62	1.27	29.05
103	40°20.1877	73°39.8647	0.23	99.55	0.12	0.09	1.54	1.53	0.57	1.18	39.58
106	40°18.9161	73°38.0057	0.00	99.70	0.20	0.10	2.82	2.76	0.54	0.66	25.89
107	40°21.1700	73°35.7988	0.10	99.76	0.08	0.06	1.63	1.58	0.42	2.51	88.58
108B	40°18.6093	73°30.8307	0.00	98.81	0.71	0.47	1.32	1.23	1.00	1.71	21.95
109	40°20.6959	73°31.2618	1.61	98.07	0.19	0.12	1.17	1.21	0.88	0.51	11.29
111	40°17.0064	73°50.7180	0.16	99.50	0.22	0.12	1.14	1.12	0.70	1.42	26.83
113B	40°15.8207	73°50.4489	3.60	95.09	0.80	0.52	1.42	1.48	1.09	0.66	19.21
114	40°17.3926	73°49.9152	26.04	70.88	1.91	1.18	0.04	0.23	1.90	0.81	6.99
115	40°16.1524	73°49.3775	0.00	99.54	0.32	0.14	1.86	1.78	0.62	1.62	36.39
116	40°15.1144	73°48.0034	55.28	44.46	0.17	0.10	1.48	1.36	1.8	0.18	0.61
117B	40°16.6294	73°48.3004	61.06	35.58	2.07	1.30	2.04	2.00	3.23	0.41	0.78
119	40°16.9364	73°45.5840	0.02	96.28	2.33	1.38	3.41	3.39	0.90	2.17	26.13
120	40°16.7614	73°47.5145	2.15	79.83	11.29	6.74	3.14	2.59	2.42	0.44	1.43
121	40°17.3357	73°43.1780	0.05	98.96	0.66	0.33	3.22	3.28	0.57	1.99	48.69
122	40°15.0564	73°42.6854	0.00	88.61	6.43	4.96	3.65	3.34	1.60	1.20	5.40
123	40°16.8574	73°39.0959	0.02	99.72	0.16	0.09	2.27	2.25	0.68	0.82	11.80
124	40°17.9016	73°38.8373	0.05	99.52	0.26	0.16	2.65	2.60	0.61	1.22	27.31
126B	40°16.8725	73°35.8178	0.06	99.74	0.13	0.07	2.11	2.02	0.71	0.56	8.23
127B	40°16.3590	73°33.2649	0.14	99.71	0.09	0.05	1.63	1.57	0.39	3.21	110.92
128B	40°18.1111	73°33.0023	0.15	99.18	0.43	0.24	2.95	2.97	0.69	0.52	22.76
130	40°16.5473	73°30.7783	0.00	99.60	0.26	0.14	2.48	2.47	0.65	1.03	18.79
131	40°20.7254	73°54.3909	11.90	87.82	0.17	0.10	0.71	1.16	1.74	0.87	3.71
132	40°19.5298	73°54.7012	0.20	99.73	0.04	0.02	1.37	1.40	0.63	0.12	7.68
133	40°19.4880	73°54.6060	0.34	99.54	0.08	0.04	1.68	1.63	0.60	0.01	22.82
134	40°19.0019	73°55.7227	4.10	92.83	1.92	1.15	1.79	1.73	1.49	0.19	11.91
135	40°17.8661	73°53.8954	11.58	56.90	19.59	11.93	2.53	1.17	3.60	0.29	0.68
137	40°18.0709	73°57.1596	0.00	99.36	0.42	0.22	2.12	2.11	0.64	2.03	39.05
138B	40°15.4400	73°56.9612	0.00	99.67	0.22	0.11	1.43	1.44	0.61	1.61	37.22
140	40°13.8677	73°47.7514	42.95	56.11	0.53	0.41	0.80	0.62	1.86	0.40	3.11
145	40°13.8448	73°44.2837	0.30	98.68	0.58	0.44	1.25	1.23	0.91	2.01	31.29
148	40°14.1789	73°38.8884	0.00	99.29	0.40	0.31	3.14	3.20	0.58	1.96	43.94
150	40°22.6688	73°50.7166	0.42	98.72	0.67	0.18	2.31	2.35	0.91	0.19	8.47
155	40°18.9580	73°45.5644	0.00	97.78	1.23	0.99	3.31	3.33	0.79	2.53	38.60
156	40°16.9479	73°47.1830	0.04	20.38	49.43	30.15	6.58	7.04	2.33	0.31	0.36
157	40°15.9893	73°46.9932	0.00	31.36	40.88	27.76	6.32	6.7	2.33	0.06	1.26
160	40°13.5162	73°45.8939	0.00	27.39	40.01	32.60	6.52	6.94	2.36	0.10	1.20
166	40°17.1193	73°44.2410	0.58	97.08	1.33	1.01	3.27	3.30	0.91	0.97	29.24
167	40°17.9296	73°41.5496	0.00	99.19	0.52	0.28	3.03	3.01	0.57	2.17	43.11
168B	40°21.2662	73°41.1340	0.32	99.27	0.26	0.16	1.88	1.74	0.64	1.78	34.96
171	40°22.7908	73°38.9711	0.07	98.63	0.78	0.52	3.10	3.11	0.67	2.2	41.25
174	40°29.9948	73°53.9743	1.79	97.76	0.28	0.17	0.97	0.84	1.02	0.77	10.87
175B	40°24.1248	73°54.0120	40.48	59.06	0.26	0.20	0.73	0.73	1.34	0.63	7.73
176	40°26.9990	73°53.9829	0.00	99.73	0.17	0.10	2.11	2.12	0.59	1.21	25.46
179	40°18.4357	73°48.5487	0.00	65.21	20.76	14.03	4.88	3.75	2.19	0.51	0.41
F001B	40°38.5060	73°07.3175	0.00	98.12	1.77	0.11	3.21	3.27	0.47	1.27	34.12
F002	40°38.2282	73°07.3592	0.00	96.49	2.69	0.82	3.37	3.37	0.72	2.65	40.91
F004	40°37.6206	73°07.1963	0.52	98.96	0.34	0.18	1.31	1.34	0.80	1.13	22.41

[1] U.S. Geological Survey, Woods Hole Field Center, 284 Woods Hole Road, Woods Hole, MA 02543-1598

[2] U.S. Army Corps of Engineers, New York District, 26 Federal Plaza, New York, NY 10278-0090

[3] Texas A&M University, Department of Oceanography, 5007 Avenue U., Galveston TX 77551

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